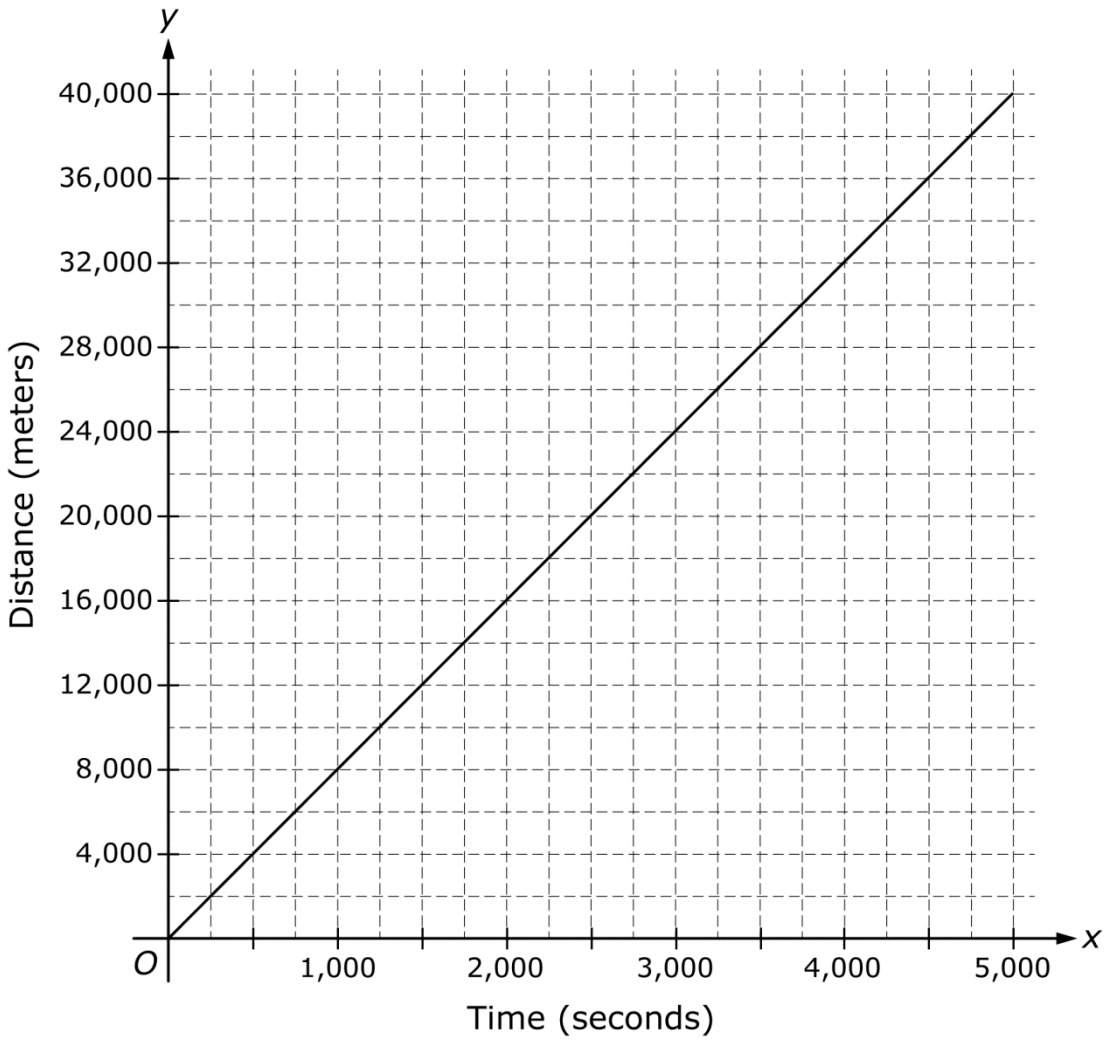
Name _____ Period _____ Date _____

Algebra I Unit 1 Model Curriculum Assessment

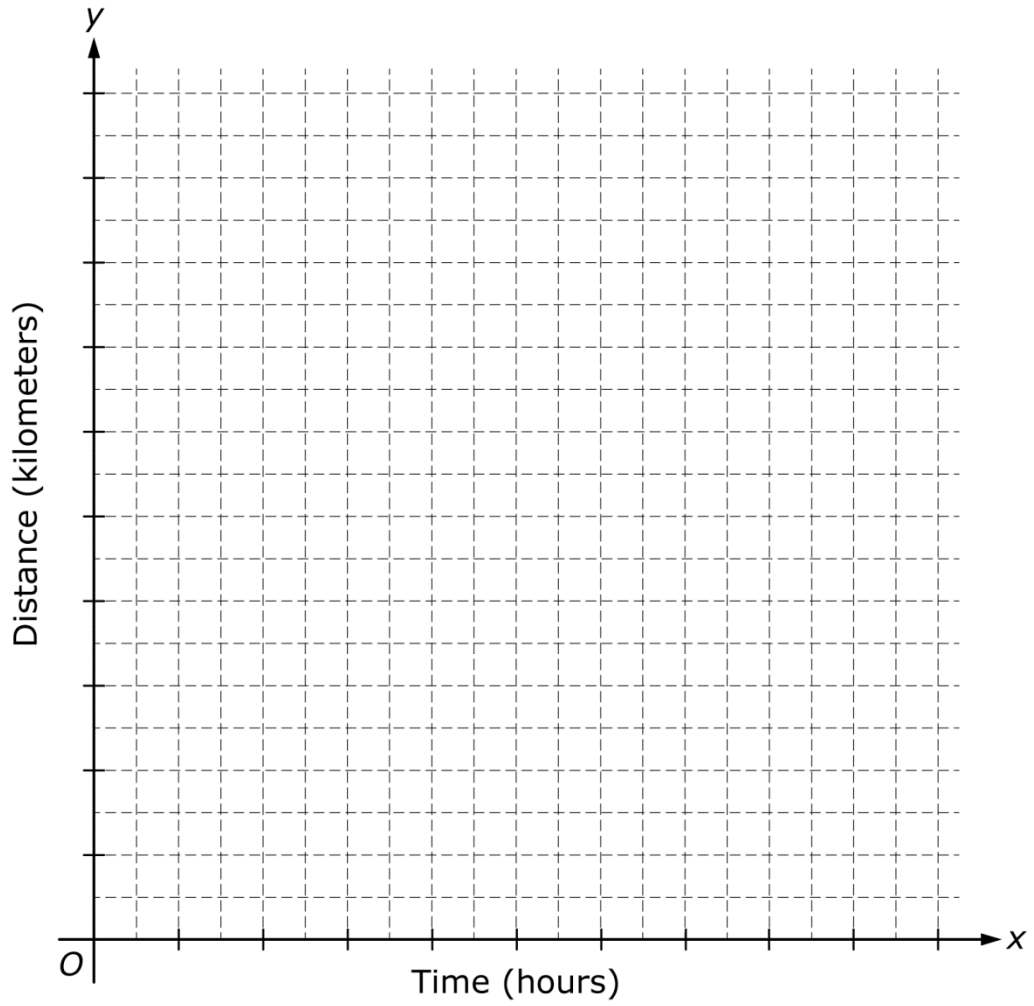
Part A

1. In a 40-kilometer bicycle race, Jayson and Raul each rode at a constant rate throughout the race. The graph below uses the units of meters and seconds to show the data for Jayson.



Part A:

Raul rode at a slower rate than Jayson. On the graph below, use the units of kilometers and hours to create a graph of possible data for Raul.



Part B:

Explain how the graph of Raul's data demonstrates a slower rate than the graph of Jayson's data.

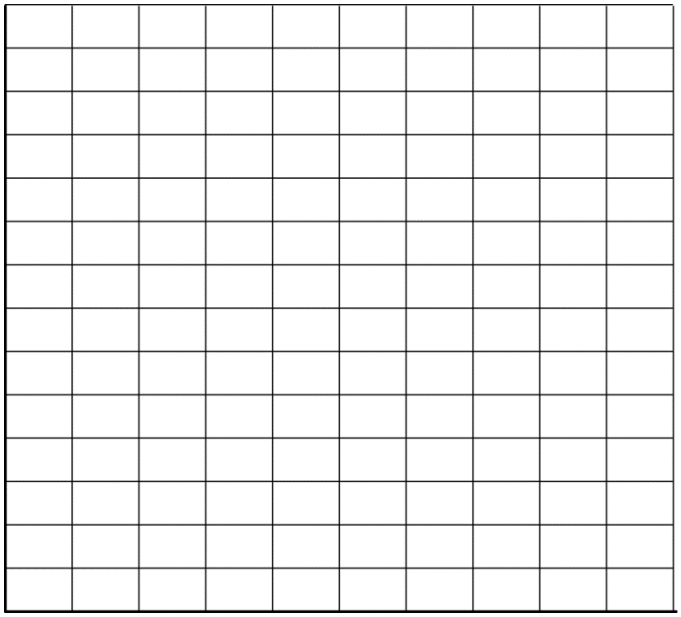
2. Concrete will be poured into a form in the shape of a rectangular prism to make a patio. The measurements of the dimensions of the form are shown in the table below. How many cubic yards of concrete are needed to fill the form?

Dimension	Measurement
Length	10 feet
Width	8 feet
Height	6 inches

3. A Canadian pump manufacturer wants to advertise and sell its pumps in New Jersey. Information about the four models of pumps the company manufactures is shown in the table below.

Model	**Maximum Flow, in Liters per Hour**
Economy	3,864
Standard	5,682
Deluxe	11,364
Supreme	14,773

Create a bar graph that shows the maximum flow for each model of pump using the unit of gallons per minute, which is more commonly used in the United States. Use the fact that 1 liter is approximately 0.264 gallons. Be sure to title and label the graph.



4. Ilona is at a friend's home that is several miles from her home. She starts walking at a constant rate in a straight line toward her home. The expression $-2t + 10$ gives the distance, in miles, that Ilona is from her home after t hours. Select True or False for each of the following.

	True	False
The friend's home is 10 miles from Ilona's home	○	○
The distance Ilona has walked away from her friend's home after t hours is given by the absolute value of $-2t$	○	○
The negative sign in the term $-2t$ indicates that Ilona is walking toward her home	○	○
Ilona is walking at a rate of 10 miles per hour	○	○

5. The number of songs purchased from an online music store on the first day the store opened was 300,000. The number of songs purchased on day x after the first day is given by the expression $300{,}000(1.008)^x$. Each day the number of songs purchased is what percent greater than the number of songs purchased the preceding day?

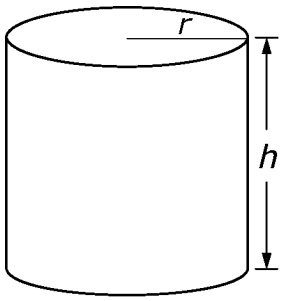
a. 300%

b. 8%

c. 1.008%

d. 0.8%

6. The formula for the surface area of a right circular cylinder is $SA = 2\pi r^2 + 2\pi rh$, where r and h are as represented below.



What does the $2\pi r^2$ in the formula represent in the problem context?

7. Which of the following is a rearrangement of $A = \frac{(b_1 + b_2) \cdot h}{2}$ that highlights the variable h ?

a. $h = \frac{A + (b_1 + b_2)}{2A}$

b. $h = \frac{2A}{(b_1 + b_2)}$

c. $h = 2A(b_1 + b_2)$

d. $h = \frac{A(b_1 + b_2)}{2}$

8. Solve the following equation. Show all work and justify each step in the work with a mathematical reason.

$$\frac{1}{3}(2x - 5) - 2 = \frac{1}{2}(x - 2)$$

9. Solve the following inequality for y, where a, b, and c are positive real numbers. Show all work and justify each step in the work with mathematical reasoning.

$$ax - by > c$$

10. Which of the following inequalities could be the result of the first step in solving the inequality $3(x-4) \le 8x + 13$ for x ?

a. $x - 4 \le \frac{8}{3}x + 13$

b. $x - 4 \le 8x + 10$

c. $3x - 4 \le 8x + 13$

d. $3x - 12 \le 8x + 13$

Part B

11. A teacher can spend as much as $125.00 to take students to a movie. A movie theater charges a $10.00 group fee and $5.50 per ticket. Which of the following inequalities represents the problem and could be solved to find the maximum number of students, *x,* who could attend the movie?

    a. $10 + 5.5x > 125$

    b. $10 + 5.5x \leq 125$

    c. $(10 + 5.5)x \leq 125$

    d. $5.5 + 10x \leq 125$

12. In a triathlon, Jenny swam for 1 hour, biked for 1.75 hours, and ran for 1 hour. Her average biking speed was 2 times her average running speed, and her average running speed was 8 times her average swimming speed. The total distance of the triathlon was 55.5 kilometers.

    Write an equation and solve it to find Jenny's average swimming speed in kilometers per hour.

13. The You Move It Company (YMI) advertises that the cost to rent a moving truck for one day is $40 plus $1.99 for each mile the truck is driven. The Drive and Move Company (DM) advertises that the cost to rent a moving truck for one day is $60 plus $1.79 for each mile the truck is driven. Alex wants to rent a single truck to use on both Saturday and Sunday on a weekend. For what driving distances should Alex rent the truck from YMI? For what driving distances does it not matter from which company Alex rents the truck? Give a mathematical explanation as to how you arrived at your answer.

14. Bill spent $60 on fertilizer and weed killer for his lawn. Each pound of fertilizer cost 75 cents, and each ounce of weed killer cost $2.50. Which of the following equations represents the relationship between the number of pounds of fertilizer Bill bought, x, and the number of ounces of weed killer he bought, y ?

a. $y = -\frac{3}{10}x + 24$

b. $y = -\frac{3}{4}x + 60$

c. $y = -\frac{5}{2}x + 60$

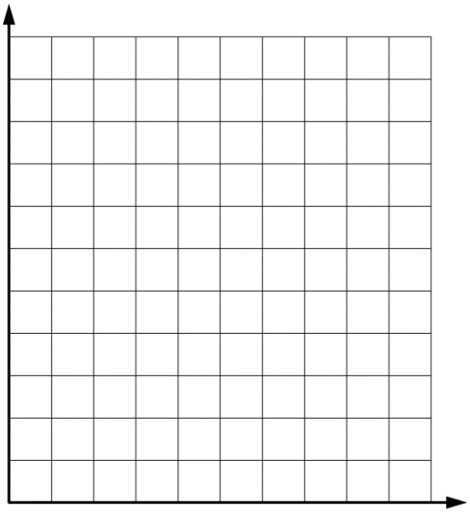
d. $y = -\frac{10}{3}x + 80$

15. A large truck has two fuel tanks, each with a capacity of 150 gallons. One of the tanks is half full, and the other tank is empty. Fuel is pumped into the tanks until both tanks are full. The pump delivers fuel at a constant rate of $5\frac{3}{4}$ gallons per minute.

a. Write an equation for the total number of gallons of fuel, g, in the two tanks in terms of the time, t, in minutes, that the pump has been filling the tanks.

b. How much fuel is in the tanks after the pump has been delivering fuel for 8 minutes?

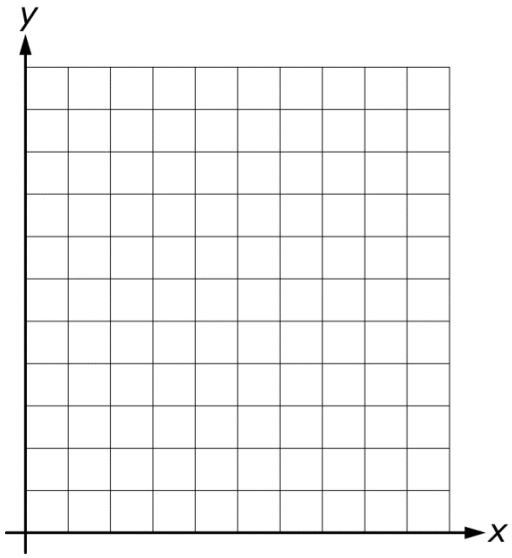
c. Graph the equation you wrote for part (a) on the coordinate plane below, including appropriate labels and scale markings.



16. The graph of a system of inequalities

- forms a bounded region
- has, at most, 1 vertical line as a boundary
- has, at most, 1 horizontal line as a boundary
- does not include the *x*-axis or the *y*-axis

a. In the coordinate plane below, sketch a graph of a system that meets the conditions above.



b. Write inequalities that correspond to the system graphed in part (a).

c. Identify a point that is a solution to the system graphed in part (a) by writing the coordinates of the point.

d. Identify a point that is NOT a solution to the system graphed in part (a) by writing the coordinates of the point.

17. A company wants to purchase two types of lightbulbs, CFL (compact fluorescent) and LED (light emitting diode). The cost of each CFL bulb is \$2, and the cost of each LED bulb is \$20. The company must purchase a total of 800 lightbulbs, must spend at most \$5,000 on the lightbulbs, and wants to purchase as many LED bulbs as possible. Let L represent the number of LED lightbulbs purchased, and C represent the number of CFL lightbulbs purchased. Which of the following systems models the situation described?

a. $\begin{aligned} 2C + 20L &= 800 \\ C + L &\leq 5{,}000 \end{aligned}$

b. $\begin{aligned} 20C + 2L &= 800 \\ C + L &\leq 5{,}000 \end{aligned}$

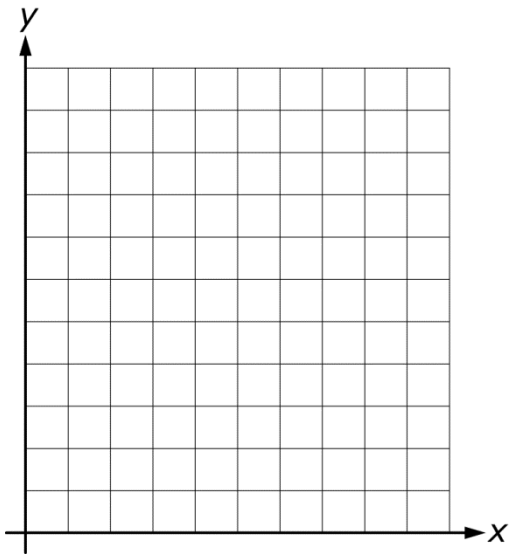
c. $\begin{aligned} 2C + 20L &\leq 5{,}000 \\ C + L &= 800 \end{aligned}$

d. $\begin{aligned} 20C + 2L &\leq 5{,}000 \\ C + L &= 800 \end{aligned}$

18. An appliance company builds washing machines and dishwashers. The company is able to build at most 750 washing machines per month and at most 600 dishwashers per month. It takes 20 hours of labor to build a washing machine and 25 hours of labor to build a dishwasher. The company has at most 20,000 hours of labor available each month.

a. Write a system of inequalities to model the problem above, where x is the number of washing machines and y is the number of dishwashers built per month.

b. Sketch a graph of the system from Part a in the coordinate plane below.



c. Can the company build 325 washing machines and 550 dishwashers in one month? Explain your answer.

d. Can the company build 400 washing machines and 475 dishwashers in one month? Explain your answer.